POST CONSTRUCTION REVIEW PROCEDURES

I. GENERAL

The purpose of the Formal and Informal Post Construction Reviews (PCR) is to provide a process for all stakeholders to review and discuss completed projects and reach a consensus on:

- What worked well and enhanced the project.
- Identifying issues and problems that could have resulted in a less than desirable product if not corrected during construction.
- Developing solutions for identified issues and problems.
- Documenting, disseminating, implementing and follow-up on this information to improve future projects, contract uniformity, cost effectiveness and reduce change orders and claims. This "lessons learned" concept will be tracked from the PCR to the initial phase of future project development plans, through the project development phase, construction phase and ultimately back to the PCR to assess results and start the process over.

II. POST CONSTRUCTION REVIEW TYPES

There are two types of PCR:

- **Formal PCR** – The formal PCR process will be an in-depth review that involves all functional units meeting to review and discuss the plans, specifications, constructability issues and determine items that went well and items that created problems and to develop solutions and consensus for those items that created problems. Constructability Review (CR) Section will prepare a PCR Report, identify action items in the report, and provide follow-up to ensure action items are being recorded, tracked and implemented for future projects, when appropriate.
- **Informal PCR** (EPM De-Briefing) – This process will be utilized for all projects that are not selected for a formal post construction review or small, straight forward projects that do not warrant the time and resources required to complete a formal post construction review. CR will coordinate and perform a debriefing with the EPM (and others as needed). CR will prepare a brief written PCR report that outlines items reviewed and discussed during the de-briefing.

The appropriate type PCR for a project will be determined by the CES Bureau, DCE, EPM and will be based on project complexity, enhancement items, issues and problems encountered and the need to gather information and data for use on future projects. The goal is to conduct a PCR for all construction projects. Resource availability and priorities will also be considered when establishing PCR goals.

Formal Post Construction Review:

The formal PCR process will be an in-depth review that involves all functional units and other stakeholders meeting to review and discuss the plans, specifications, constructability issues and determine items that went well and enhanced the project and identifying issues and problems that could have resulted in a less than desirable product if not corrected during construction. Projects

selected for this type of PCR will typically be large and complex, have encountered major problems during construction, and utilized new and/or innovative materials or construction processes. Information obtained from the PCR for this type project has a high probability of improving future project designs and product quality resulting in significant cost savings.

The PCR meeting will be scheduled and facilitated by the CR Section of the CES Bureau and may be held in the District Office or Helena. All stakeholders involved in the project should attend in person or using the Polycom conference system.

The goal is to perform a minimum of one formal PCR per District per year. When scheduling a PCR, timing of project completions, availability of resources and workload priorities will be considered. The following items will be considered when scheduling, coordinating and conducting the PCR meeting:

- Request e-mail comments 5 working days before the meeting from stakeholders that cannot attend.
- Do not conduct a PCR on a project with an active claim.
- Coordinate with Consultant Design Bureau to invite the Design Consultant.
- Invite the Contractor and any major subcontractors.
- Invite the City or County representative, as appropriate.
- Invite appropriate Maintenance representative.
- Invite FHWA District Operations Engineer.
- The District Constructability Reviewer (CR) and the District CES Reviewer will attend.
- Action items and follow-up required. Use the established database and tracking log system.
- Provide copies of any change orders for review.
- Provide copies of all closed Claims for review.
- Provide copies of all Value engineering proposals for review.
- Provide copies of all Construction Review Reports and Audit Reports for review.
- Provide copies of the plans and Special Provisions.
- Provide an agenda to all attendees at least 3 working days before the meting.
- CR, or a designee, will take notes of the meeting and prepare meeting minutes that include action items and names of persons responsible to action item follow-up.
- CR will enter resolution of follow-up items in the report, database and tracking log and the name of the person who performed follow-up items.

The purpose of the PCR meeting is to identify all the “good, bad and ugly” aspects of a project. Attendees at the PCR meeting should come with an open mind and prepared to present facts and information and focus on constructive suggestions to enhance the overall project delivery process and improve project quality. During the PCR meeting, the following items will be reviewed, discussed and evaluated:

- Special Provisions
- Plan Sheets
- Q&A During Bidding Process
- Bid Addendum
- Change Orders
- Claims Issues – Do not conduct a PCR if there is an active claim.
- Value Analysis Recommendations (During Project Development Process).
- Value Engineering Proposals (Received from Contractor after Award).

- Constructability Issues.
- Maintenance issues and concerns.
- New technology or construction processes used.
- Any innovative solutions or methods.
- Issues, problems and subsequent solutions.
- Scheduling and time to complete the project.
- Assign a lead person for all action items.
- Any R/W agreement requirements that created construction issues.

This information will be placed into a report and disseminated throughout MDT and entered into the database and tracking log. The CR will be responsible for the follow-up and resolution of questions, issues and action items resulting from the meeting. Relevant solutions and ideas from the follow up will be included as information and reference in the database and tracking log.

The following personnel and/or representatives should be included in the PCR meetings:

DA	DCE and DOE	DESS
EPM/Others	District Lab	Materials Bureau
District CR, District CES Reviewer and others with technical expertise such as Mike Lynch for concrete, Pat Ernst for plant mix or Bob Weber for PCCP. Contract Plans Bureau	Design (Roadway, Bridge, Traffic, Hydraulics – As Needed)	Design Project Manager
Consultant Design Bureau and Design Consultant	City/County	FHWA District Operations Engineer
Maintenance Chief for Area, Maintenance Supervisor for Area and Others	Contractor and Subcontractors (if needed)	Environmental Bureau

Depending on project size, scope and complexity, the typical meeting could last 3 to 6 hours. An on-site review will only be scheduled if needed.

Informal Post Construction Review (EPM De-Briefing):

This process will be utilized for all projects that are not selected for a formal post construction review or small, straight forward projects that do not warrant the time and resources required to complete a formal post construction review. CR will coordinate and perform a debriefing with the EPM (and others as needed). CR will prepare a brief written PCR report that outlines items reviewed and discussed during the de-briefing. The informal PCR process will be used as a tool to assist CES Bureau in achieving the goal to perform a PCR for all projects. The PCR follow-up action item documenting and tracking will follow the same procedures as outlined herein for a formal PCR.

The following procedure will be followed for performing an informal PCR (EPM de-briefing):

1) CR will determine when project has been completed.
2) Contact EPM to outline the informal PCR process and schedule a de-briefing date/time and location. Confirm date/time and location and advise DCE.

3) Provide EPM a list of items to be reviewed and discussed prior to the meeting and copy DCE. The following is an example list:

- Review any general items related to the project such as overall contractor performance, completeness of plans and specifications, how the project progressed.
- Identify specific plan and specification items that enhanced overall project progress and quality.
- Identify specific plan and specification shortcomings that hindered overall project progress and could have affected project quality.
- Were final quantities within reasonable tolerances?
- Identify specific problems and issues related to construction means and methods and how those issues were resolved.
- Review any change orders.
- Review any closed claims and "lessons learned" resulting from any claims.
- Specific suggestions that could improve constructability for future similar projects.

4) After the meeting, establish a deadline for any follow-up comments.
5) When workload priorities and schedule constraints in the CES Bureau or for the EPM warrant, the CR may perform the de-briefing by telephone, e-mail or using the Polycom conference system. The same items outlined for the meeting will be reviewed and discussed using the non-meeting process.
6) There may be completed projects that the EPM, DCE and CR agree do not justify any additional PCR beyond a brief Post Construction Report prepared by the EPM. The CR will review the Post Construction Report and follow-up with any suggestions, recommendations or issues noted in the report.

III. COMPLETE PCR PROCESS

There are four major steps required to complete the PCR process: 1) Prepare Report and Identify Action Items; 2) Document and Monitor; 3) Implementation; and 4) Measure Effectiveness of the Program. The procedures necessary to complete each of the steps are outlined herein.

Prepare PCR Report and Identify Action Items:

The PCR report will be based on the notes taken during the meeting and the meeting minutes prepared after the meeting. Since there may be follow-up items that will take additional research and coordination time and effort after the meeting, it is important that the CR prepare the meeting minutes within 5 working days after the meeting. The meeting minutes will identify all action items and names of persons responsible for the action item. The minutes should also identify any follow-up items to be completed by the CR.

The PCR report will contain the following minimum information:

I. Cover Sheet

- Project Number and Control Number
- Project Description
- Date of Report
- Name of Preparer

II. Introduction

1) Date of PCR Meeting
2) Name, title, organization, telephone number and e-mail address of each PCR Meeting attendee using a standard sign-in form created for this information.
3) EPM Name and Location
4) Contractor (and major subcontractors) Name and Address
5) Project Description

III. Review and Discussion Items

1) General Project Comments related to the project such as overall contractor performance, completeness of plans and specifications, how the project progressed.
2) Provide a Project Cost Summary and outline the details of any cost variations.

    - Engineer's Estimate
    - Original Contract Award Amount
    - VE Amounts
    - Change Order Amounts
    - Closed Claim Amounts

3) Specific comments related to Standard Specifications, Supplemental Specifications and Special Provisions.
4) Specific comments related to the Plans.
5) Specific comments related to major project components such as grading, bridge, surfacing or traffic control.
6) Provide a list of major quantity changes (plus or minus) from the original estimated quantities and reasons for the changes.
7) Outline contract time provided, any time added and actual time utilized.
8) Identify originator and content of any compliments or complaints received during construction of the project.
9) List any follow-up items that needed additional research by the CR in order to determine justification and relevance and disposition of the items.
10) List any action items that will be documented, entered into the database and tracking log for future project implementation and follow-up.

Recommended distribution of the PCR Report:

- PCR Meeting Attendees
- District Administrators
- All DCE and DOE
- All DESS
- Preconstruction Engineer and Bureau Chiefs
- Construction Engineer and Bureau Chiefs (Including Contract Plans)
- Engineering Division Administrator
- FHWA
- Others, as appropriate

Document and Monitor:

The CR will enter the action items identified in the PCR Report in the PCR database and tracking log for use as a tool to track issues/problems and initiating their proposed solutions as outlined in the PCR Report. This "lessons learned" concept will be carried through from PCR to the start of the project development process for future projects, then monitored through the next construction cycle to determine their effectiveness to improve constructability and project quality.

Implementation:

The CR Section is the point of contact and will be responsible for the coordination, dissemination and implementation of short and long-term changes and updates in the project development and design process to improve constructability and quality.

Regardless of the type of PCR performed, the CR will facilitate implementation of Lessons Learned at an early phase for future projects through interaction and coordination with District Administrators, District Engineering Services Supervisors, District Construction Engineers, Construction Engineer and the Preconstruction Engineer. If proposed recommendations or solutions are not implemented, or if those implemented need further explanation, the justification will be adjudicated and documented in the database and tracking log for future reference.

Measure Effectiveness of the Program:

In order to determine and measure the effectiveness of the CR program, the implemented changes resulting from the PCR recommendations must be monitored through future project development and construction processes. Effectiveness must also be measurable in order to compare results before and after implementation.

The Value Analysis and Constructability Review Programs will be measured using one or more of the following criteria:

1) Reduction in the number of Bid Q&A and Bid Addendum.
2) Reduction in quantity amount changes.
3) Reduction in number and dollar value of Change Orders.
4) Reduction in number and dollar value of Claims.

Reduction in Number of Bid Addendum – Compare the number of Bid Q&A and Addendum per 25 projects bid prior to the CR/VA program implementation date with the number of Bid Q&A and Bid Addendum per 25 projects bid during the 24 months after the CR/VA program implementation date.

Reduction in Quantity Amount Changes – Compare 10 projects with a construction cost of $2,000,000 to $5,000,000 completed during the 12-month period prior to the CR/VA program implementation date with 10 completed similar projects that participated in the CR/VA program during the project development process.

Reduction in Number and Dollar Value of Change Orders - Compare 10 projects with a construction cost of $2,000,000 to $5,000,000 completed during the 12-month period prior to the CR/VA program implementation date with 10 completed similar projects that participated in the CR/VA program during the project development process.

Reduction in Number and Dollar Value of Claims - Compare the number and dollar value of claims per 25 projects completed during the 12-month period prior to the CR/VA program implementation date with the number and dollar value of claims per 25 projects completed during the 24 months after the CR/VA program implementation date.

The CR/VA programs will be reviewed annually after the first year of implementation and the CR Section Supervisor will prepare an Annual Report that includes a review of the overall CR/VA programs with recommended revisions, additions or deletions in the program processes and procedures. The report will also include a summary of the cost effectiveness measurement criteria and an estimate of any identified cost savings and quality improvements resulting from the programs.

FORMAL POST CONSTRUCTION REVIEW FLOW CHART